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Curves (1920, 16 + 388 pages; price 28 shillings).—Another volume by Sir Thomas Heath (cf. *1921*, 133) appeared in the "Pioneers of Progress: Men of Science" series (London, Society for the Promotion of Christian Knowledge, 1921, 3 + 59 pages; price 2 shillings and 6 pence). It is entitled: *The Copernicus of Antiquity* (*Aristarchus of Samos*).

About a year ago a semi-monthly publication *Princeton Lectures* was founded by Princeton University for distribution to its alumni. Each issue contains a lecture by some member of the Princeton faculty, an introductory note on the lecture, and a brief biographical sketch of the lecturer. In number two, published May 1, 1920, the lecture was "Modifying our ideas of nature" by Professor H. N. RUSSELL. The introductory note was on "The Einstein theory of relativity."

"Contributions from the Mathematical and Physical Departments" is the subtitle of *Bryn Mawr College Monographs*, volume 4 (1904) and volume 8 (1909). In 1915 the mathematics department of the University of Edinburgh published a series of eleven "Research Papers" which were reprints from various journals. This plan has now been followed in connection with *Publications of the Massachusetts Institute of Technology* with its "Contribution from the Department of Mathematics," serial II, nos. 1–16, May, 1920–February, 1921. These articles are reprinted from *Annals of Mathematics, Bulletin of the American Mathematical Society, Proceedings of the American Academy of Arts and Sciences, Proceedings of the London Mathematical Society, Proceedings of the National Academy of Sciences, Proceedings of the Royal Irish Academy, Proceedings of the Royal Society of Edinburgh*, and *Transactions of the American Mathematical Society.* Five of the articles are by Norbert Wiener, three by F. L. Hitchcock, two by Joseph Lipka, two by S. D. Zeldin, one by J. S. Taylor, two by C. L. E. Moore and H. B. Phillips together, and one by C. L. E. Moore alone. Although these "contributions" are labelled "serial II" there was no serial I. It was feared that the labelling of this series as "serial I" would imply absence of antecedent activity.

ARTICLES IN CURRENT PERIODICALS.

AMERICAN JOURNAL OF MATHEMATICS, volume 42, no. 4, October (published in December), 1920: "Geometrical significance of isothermal conjugacy of a net of curves" by E. J. Wilczynski, 211–221; "Observations weighted according to order" by P. J. Daniell, 222–236; "Some determinant expansions" by L. H. Rice, 237–242; "A general implicit function theorem with an application to problems of relative minima" by K. W. Lamson, 243–256; "On the Laplace-Poisson mixed equation" by R. F. Borden, 257–277; "Characteristic subgroups of an abelian prime power group" by G. A. Miller, 267–286.

ANNALS OF MATHEMATICS, second series, volume 22, no. 2, December, 1920: "The mean of a functional of arbitrary elements" by N. Wiener, 66–72; "On certain determinants associated with transformations employed in thermodynamics" by J. E. Trevor, 73–85; "The permanent gravitational field in the Einstein theory" by L. P. Eisenhart, 86–94; "On the structure of finite continuous groups with a finite number of exceptional infinitesimal transformations" by S. D. Zeldin, 95–100; "Conformal mapping of a family of real conics upon another" by T. H. Gronwall, 101–127; "On the location of the roots of the derivative of a polynomial" by J. L. Walsh, 128–144 [First sentence: "This paper contains some geometric results concerning the relative positions of the roots of a polynomial and those of its derivative. Although not entirely restricted to real polynomials, and although the cubic is especially treated in detail, most of the results here presented are naturally connected with the following theorem of Jensen's:

"If circles are described whose diameters are the segments joining pairs of conjugate imaginary roots of a real polynomial $f(z)$, then every non-real root of the derivative $f'(z)$ lies on or within those circles." In this connection, Dr. Walsh remarks "No proof of Jensen's theorem has previously been published." This remark is inaccurate since the proof of the theorem was published in the AMERICAN MATHEMATICAL MONTHLY, *1920*, 299–300.]

BULLETIN OF THE AMERICAN MATHEMATICAL SOCIETY, volume 27, no. 3, December, 1920: "The October meeting of the American Mathematical Society" by F. N. Cole, 97–103; "The mathematical congress at Strasbourg" by D. E. Smith, 104–108; "Note on a method of proof in the theory of Fourier's series" by D. Jackson, 108–110; "On implicit functions" by F. H. Murray, 111–113; "On a pencil of nodal cubics. Second paper" by N. Altshiller-Court, 114–115; "Hausdorff's *Grundzüge der Mengenlehre*" by H. Blumberg, 116–129 [Review of Hausdorff's book published at Leipzig, 1914]; Review by D. E. Smith of F. P. Barnard's *The Casting-Counter and the Counting Board*, (Oxford, Clarendon Press, 1916), 129–131; Review by A. Emch of S. Ganguli's *Lectures on the Theory of Plane Curves* (Calcutta, 1919), 132–135; "Notes," 137–145; "New Publications," 145–148.

BULLETIN OF THE CALCUTTA MATHEMATICAL SOCIETY, volume 11, nos. 1–2, September, 1920: "Potent divisors of the characteristic matrix of a minimum simple square ante-slope" by N. Ghosh, 1–6; "Liquid motion inside certain rotating curvilinear rectangles" by N. Sen, 7–20; "On the horpolhode" by S. Basu, 21–22; "On a generalization of Neumann's expansion in a series of Bessel functions" by A. Datta, 23–34; "A note on the theory of the magnetometer" by L. Srivastava, 35–42; "On the motion of an elongated spheroid in viscous fluid media" by B. Pal, 43–50; Review by A. C. Bose of Cullis's *Matrices and Determinoids* (volumes 1–2, Cambridge, 1913–1918), 51–82; "Notes on spherical waves of finite amplitude" by S. Banerji, 83–90; "On the theory of continued fractions" (third paper) by H. Datta, 91–100; "Notes and News," 101–103.

MATHEMATICAL GAZETTE, volume 10, December, 1920: "The Durham summer course in mathematics for teachers in secondary schools" by G. J. B. Westcott, 161–169; "Vector analysis in a university course" by C. E. Weatherburn, 170–172; "The rule of signs for a product: the completed multiplication table" by S. Lister, 173–174; "Conical projection of a conic" by H. E. Girdlestone, 174–176; "Convergence of series" by P. J. Heawood, 176–177; "Note on the integration of the difference between two Fagnano arcs of an ellipse" by E. M. Langley, 177–178; Reviews by H. G. F. of J. B. Shaw's *Lectures on the Philosophy of Mathematics* (Chicago, 1918) and C. J. Keyser's *The Human Worth of Rigorous Thinking* (New York, 1916), 181–183; Review of H. E. Licks's *Recreations in Mathematics* (New York, 1917), 186–187; Review (continued) of A. Macfarlane's *Lectures on Ten British Physicists of the Nineteenth Century* (New York, 1919), 187–190.

THE MATHEMATICS TEACHER, volume 13, No. 2, December, 1920: "Educational opportunity in the army of occupation" by J. T. Rorer, 45–52; "The outline method in mathematics" by R. R. Goff, 53–56; "Greek philosophers on the disciplinary value of mathematics" by F. Cajori, 57–62; New Books, 63–63; Notes and News, 65–68.

NATURE, volume 106, November 25, 1920: "Archimedes" [Review of T. L. Heath's *Archimedes* (London and New York, 1920)] by G. B. M[athews], 401–402. [First paragraph: "By the general consent of all competent judges Archimedes is one of the greatest mathematicians the world has ever seen. It is not easy to justify this opinion to a popular audience, most members of which know little and care less about mathematics; but Sir Thomas Heath's book ought to succeed in making the ordinary reader understand to some extent the nature of Archimedes' discoveries, and in arousing interest in the achievements of Greek mathematicians."]

NOUVELLES ANNALES DE MATHÉMATIQUES, volume 79, November, 1920: "Étude des surfaces de translation de Sophus Lie" by B. Gambier, 401–423; "Sur la cubique à point double" by N. Altshiller-Court, 424–434; "Agrégation des Sciences Mathématiques (concours de 1920). Sujets de composition," 435–448.

PHILOSOPHICAL MAGAZINE, sixth series, volume 40, November, 1920: "The torsion of closed and open tubes" by J. Prescott, 521–541; "The modification of the parabolic trajectory on the theory of relativity" by W. B. Morton, 674–677.

PHYSICAL REVIEW, second series, volume 16, no. 5, November, 1920: "On the free oscillations of spheroids" by R. N. Ghosh, 477–480.

POPULAR ASTRONOMY, volume 28, December, 1920: "Historical notice of John Nelson Stockwell of Cleveland" by T. J. J. See, 565–584 (frontispiece portrait) [see *1920*, 383].

PROCEEDINGS OF THE BENARES MATHEMATICAL SOCIETY, volume 1, 1919: "Constitution of the Society," i–viii; "List of members," ix–xii; "Report of the secretary," xiii–xvi; "Records of proceedings at meetings," xvii–xxi; "Remarks and criticisms on some results of Mrs. A. G. Kerkhoven-Wythoff" by H. Datta, 1–8; "The effect of the double suspension mirror on the sensitiveness of the balance" by Gorakh Prasad, 9–14; "On a result in the expansion of an arbitrary function" by Lakshmi Narayan, 15–29; "On cosmic synthesis (part I)" by S. V. Ramamurty, 30–37; "On certain new tautochrones determinable by quadratures" by S. Pande, 38–42; "On the functions and needs of a mathematical society" by Ganesh Prasad, 43–51—Vol. 2, part 1, 1920: "On the application of Burgess's method for determining the uniform motion of an ellipsoid of revolution through a viscous liquid along its axis of revolution" by D. K. Sen, 1–11; "On the expansion of the product of two parabolic cylinder functions in a series of parabolic cylinder functions" by Gorakh Prasad, 12–22; "Notes on vortices in a compressible fluid" by B. Datta, 23–31; "On the potential of a double layer whose strength has a discontinuity of the second kind" by Ganesh Prasad, 32–41.

REVUE DE L'ENSEIGNEMENT DES SCIENCES, volume 14, July–October, 1920: "Sur la représentation paramétrique d'une surface" by F. Meyer, 148–151; "Propriétés focales des quartiques bicirculaires" by R. Dontot, 151–168; "Sur certains trièdres" by C. Bioche, 168–172; "Problèmes de mathématiques et de physiques donnés au baccalaureat en octobre, 1919," 173–191.

REVUE DE MATHÉMATIQUES SPÉCIALES, volume 13, December, 1920: "Au sujet de la ligne de striction d'une surface réglée" by H. Girard, 345–347; Questions and solutions, 347–368—Volume 13, January, 1921: "Sur les moments de vecteurs" by —. Rech, 369–372; Questions and solutions (analytic geometry, descriptive geometry, and calculus), 372–380, 383–390; "Agrégation des sciences mathématiques, sujets de concours, session normale de 1920," 380–383.

REVUE GÉNÉRALE DES SCENCES, volume 31, November 30, 1920: "Un anniversaire ignoré" by J. and C. Felix, 713 ["La date du 11 november 1920, en plus de son intérêt national, ramène à trois cents ans d'intervalle un anniversaire de la pensée scientifique. Descartes avait, en effet, mis en marge d'un de ses manuscrits la note suivante: *XI Novembris 1620 coepi intelligere fundamentum inventi mirabilis:* le 11 novembre 1620 j'ai commencé à comprendre le fondement d'une découverte digne d'admiration. Il avait eu déjà en 1619 et à la même date sa nuit d'enthousiasme durant sa retraite d'hiver passée dans un poêle. Il l'avait ainsi notée: *X Novembris 1619, cum plenus forem enthusiasmo et mirabilis scientiæ fundamenta reperirem.* . . . D'après le texte même du *Discourse de la Méthode* (1637), c'est en 1619, que Descartes 'empruntant tout le meilleur de l'analyse géométrique et de l'algèbre, corrigeant tous les défauts, de l'une par l'autre,' jeta les bases de sa 'mathématique universelle' qui devait faire dans son esprit de toutes les sciences une même chaine. La découverte remarquable qu'il fit et nota en 1620 est probablement (d'après Carnot) cette méthode des indéterminées 'qui est si admirable qu'elle touche à l'analyse infinitésimale, et que l'analyse infinitésimale n'en est qu'une heureuse application.'

"A vingt-quatre ans, Descartes était en possession des bases de tout son système scientifique. Pendant que cette grande pensée va fonder à partir du célèbre 'Je pense donc je suis' toute une philosophie nouvelle, sa méthode va guider par ses principes ou ses effets la plupart des sciences modernes. C'est cette influence prépondérante d'un génie francais que l'on célébrait dernièrement aux fêtes organisées à Amsterdam en l'honneur de Descartes. On y a rappelé les grandes étapes de la pensée cartésienne. Et puisque le philosophe en a noté lui-même les dates, on peut rappeler celle du 11 novembre 1620 si intéressante pour l'histoire générale des sciences."] Compare pages 166–167 of this issue of the MONTHLY.

AMERICAN DOCTORAL DISSERTATIONS.

R. F. BORDEN, *On the Laplace-Poisson mixed equation.* [Reprinted from *American Journal of Mathematics*, Vol. 42, 1920]. Pages 257–277 + "Vita." (Univ. of Illinois, 1918.)

J. M. KINNEY, *The general theory of congruences without any preliminary integrations.* Lancaster, Pa., 1920. 32 pages. (Univ. of Chicago, 1917.)

L. J. ROUSE, *A contribution to the question of linear dependence in linear integral equations.* [Reprinted from *Tôhoku Mathematical Journal*, Vol. 15, 1919, pp. 184–216]. 33 pages. (Univ. of Michigan, 1918.)

W. G. SIMON, *On the solution of certain types of linear differential equations in infinitely many variables.* [Reprinted from *American Journal of Mathematics*, Vol. 42, 1920]. Pages 27–47. (Univ. of Chicago, 1918).

T. McN. SIMPSON, JR., *Relations between the metric and projective theories of space curves.* Lancaster, Pa., 1920. 4to. 26 pages. (Univ. of Chicago, 1917.)